

WHAT IS CLAIMED IS:

1. A method for embedding message data in a digital image sequence having two or more frames, comprising the steps of:
 - a) providing a dispersed message image representative of the message data; and
 - b) combining spatially shifted versions of the dispersed message image with successive frames of the digital image sequence.
2. The method claimed in claim 1, wherein the step of providing a dispersed message image includes the steps of:
 - a1) producing a message image representing the message data;
 - a2) providing a carrier image; and
 - a3) convolving the message image with the carrier image to produce the dispersed message image.
3. The method claimed in claim 1, wherein the spatially shifted dispersed message images are not visible when added to the frames of the digital image sequence.
4. The method claimed in claim 2, wherein the carrier image has random phase and substantially flat Fourier amplitude.
5. The method claimed in claim 2, wherein the spatially shifted versions of the dispersed message image are generated by shifting the carrier image prior to convolving with the message image.
6. The method claimed in claim 5, wherein the carrier image is circularly shifted.

7. The method claimed in claim 1, wherein the spatially shifted versions of the dispersed message image are generated by circularly shifting the dispersed message image.

8. The method claimed in claim 1 wherein the spatially shifted versions of the dispersed message image are shifted randomly for successive frames.

9. The method claimed in claim 1, further comprising the steps of:
c) extracting the message image from a plurality of frames of the image sequence; and

d) averaging the extracted message images to provide an improved signal-to-noise ratio.

10. The method claimed in claim 2, further comprising the steps of:

c) extracting the message image from a plurality of frames of the image sequence by correlating the carrier image with the respective frames; and

d) averaging the extracted message images to provide an improved signal-to-noise ratio.

11. The method claimed in claim 1, further comprising the steps of:

c) determining the spatial shift applied to each spatially shifted version of the dispersed message image; and

d) aligning a plurality of frames based on the determined shift applied to the respective dispersed message images and averaging the aligned frames to produce an average frame; and

e) extracting the message image from the averaged frame.

12. The method claimed in claim 2, further comprising the steps of:

- c) determining the spatial shift applied to each spatially shifted version of the dispersed message image; and
- d) aligning a plurality of frames based on the determined shift applied to the respective dispersed message images and averaging the aligned frames to produce an average frame; and
- e) extracting the message image from the averaged frame by correlating the carrier image with the averaged frame.

13. A system for embedding message data in a digital image sequence having two or more frames, comprising:

- a) means for providing a dispersed message image representative of the message data; and
- b) means for combining spatially shifted versions of the dispersed message image with successive frames of the digital image sequence.

14. The system claimed in claim 13, wherein the means for providing a dispersed message data image includes:

- a1) means for producing a message image representing the message data;
- a2) means for providing a carrier image; and
- a3) means for convolving the message image with the carrier image to produce the dispersed message image.

15. The system claimed in claim 13, wherein the spatially shifted versions of the dispersed message image are not visible when added to the frames of the digital image sequence.

16. The system claimed in claim 14, wherein the carrier image has random phase and substantially flat Fourier amplitude.

17. The system claimed in claim 14, wherein the means for spatially shifting the dispersed message image includes means for shifting the carrier image prior to the means for convolving with the message image.

18. The system claimed in claim 17, wherein the means for shifting the carrier image employs circular shifting.

19. The system claimed in claim 13, wherein the means for spatially shifting the dispersed message image employs circular shifting.

20. The system claimed in claim 13 wherein the means for spatially shifting the dispersed message image employs random spatial shifts.

21. The system claimed in claim 13, further comprises:

c) means for extracting the message image from a plurality of frames of the image sequence; and

d) means for averaging the extracted message images to provide an improved signal-to-noise ratio.

22. The system claimed in claim 14, further comprises:

c) means for extracting the message image from a plurality of frames of the image sequence by correlating the carrier image with the respective frames; and

d) means for averaging the extracted message images to provide an improved signal-to-noise ratio.

23. The system claimed in claim 13, further comprises:

c) means for determining the spatial shift applied to each spatially shifted version of the dispersed message image; and

d) means for aligning a plurality of frames based on the determined shift applied to the respective dispersed message images and averaging the aligned frames to produce an average frame; and

e) means for extracting the message image from the averaged frame.

24. The system claimed in claim 14, further comprises:

c) means for determining the spatial shift applied to each spatially shifted version of the dispersed message image; and

d) means for aligning a plurality of frames based on the determined shift applied to the respective dispersed message images and averaging the aligned frames to produce an average frame; and

e) means for extracting the message image from the averaged frame by correlating the carrier image with the averaged frame.

25. A digital image sequence produced by the method of claim 1.

26. A computer program for performing the method of claim 1.